

**The Apoidea Collection of the California Insect Survey (C.I.S.)  
at the Essig Museum of Entomology,  
University of California, Berkeley**

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*History of the Apoidea collection*

The insect collection of the University of California at Berkeley was established in 1940 as a project of the California Agricultural Experiment Station and officially designated as the "California Insect Survey". Prior to 1940, A. T. McClay had managed the collection. At the urging of E. G. Linsley and R. L. Usinger, the insect collection was given formal recognition by E. O. Essig, who was Chair of the Department of Entomology during 1943–1952. P. D. Hurd Jr. supervised the collection from 1947–1962 and from 1963 to the present it has continued under the leadership of J. A. Powell. Since 1967 the collection has been housed in parts of three floors remodeled for this purpose in Wellman Hall on the main campus in Berkeley. The parasitic Hymenoptera are maintained by the Division of Biological Control at the Gill Tract in Albany, CA. In 1972 the collection and associated facilities were named the Essig Museum of Entomology. For further historical information see: Linsley, E. G. [1955. The Department of Entomology and Parasitology (Berkeley-Davis). *Entomol. News* 66:133–138], Powell, J. A. [1972. The California Insect Survey. *Div. Entomol. Agric. Exp. Sta. Univ. Calif., Berkeley* 22 pp. (mimeo)] and Powell, J. A., et al. (1973. Entomological collections of the University of California. *Bull. Entomol. Soc. Amer.* 19:100–102).

The principal contributors to the growth of the bee collection were E. G. Linsley, and his students P. D. Hurd and J. M. MacSwain. National Science Foundation grants awarded to Linsley and MacSwain during the 1950's promoted apidology, particularly pollination biology. As part of their doctoral dissertations, collections were deposited at the C.I.S. by J. S. Rozen (now at Amer. Mus. Nat. Hist.) and R. W. Thorp (now at Univ. Calif., Davis), both Linsley's students, and G. I. Stage (now at Stafford Springs, CT), Hurd's student. These early contributions have been supplemented by the efforts of J. A. Powell, J. T. Doyen, J. A. Chemsak, H. V. Daly and others. In addition to P. H. Timberlake (Univ. Calif., Riverside), other researchers who have identified considerable portions of our bee collection are: C. D. Michener (Univ. Kansas, Lawrence) and R. R. Snelling (Los Angeles County Museum, CA) (Colletidae); G. Hackwell (Turlock, CA), W. LaBerge (Ill. Nat. Hist. Surv. Insect Ident., Urbana), R. Thorp (Andrenidae); G. Eickwort (Cornell Univ., Ithaca, NY), R. McGinley (USNM, Washington, DC), Michener and R. R. Roberts (Rutgers Univ., New Brunswick, NJ) (Halictidae); A. A. Grigarick (Univ. Calif., Davis), G. E. Bohart, T. Griswold and F. Parker (all at the Bee Biol. Lab.,

Logan, UT), Michener and T. B. Mitchell (Univ. North Carolina, Raleigh) (Megachilidae); Griswold and Thorp (Apidae); Bohart, R. W. Brooks (Univ. Kansas), LaBerge and Snelling (Anthophoridae) and others.

### *Holdings and their curatorial condition*

The Apoidea collection houses about 314,000 bees in 521 drawers including 114 drawers (22% of the total) that contain material identified only to genus or family. Most specimens on loan have not been included in the count. The C.I.S. ranks among the three largest bee collections in North America. In terms of identified species/subspecies it probably has the most extensive holdings of bees from western North America.

Western North America is defined here as the area circumscribed by the states or provinces of: Alaska, Northwest Territories, British Columbia, Alberta, Washington, Oregon, Idaho, Montana, Wyoming, California, Nevada, Utah, Colorado, New Mexico, Arizona and Baja California. The Essig Museum of Entomology has specimens of 54% of the reported species/subspecies for western North American bees (47% Colletidae, 100% Oxaeidae, 53% Andrenidae, 58% Melittidae, 55% Halictidae, 71% Megachilidae, 42% Anthophoridae, 80% Apidae) and 47% of the reported species/subspecies for North America (55% Colletidae, 100% Oxaeidae, 47% Andrenidae, 44% Melittidae, 41% Halictidae, 66% Megachilidae, 34% Anthophoridae, 79% Apidae) [Krombein, et al. 1979. Catalog of the Hymenoptera in America North of Mexico. Vol. 2. Apocrita (Aculeata). Smithsonian Institution Press. Washington, D.C.].

C.I.S. holdings are abundant for the Nearctic region, especially southwest United States. Mexico and Central America, particularly Costa Rica, are also well represented; there are lesser collections from other Neotropical areas. Collections received incidentally from the Palearctic, Ethiopian, Oriental and Australian regions, usually have been deposited at the California Academy of Sciences or at the University of California, Davis. Table 1 summarizes the estimated number of specimens, number of genera and species/subspecies, as well as the amount with type material, voucher specimens and nest materials per family. The 224 name-bearing types are on loan of indefinite duration to the California Academy of Sciences, San Francisco, CA.

Hurd and Linsley supervised major curatorial work, primarily undertaken by K. Sorensen during the 1960's and 1970's. Most of our holdings are at curatorial level 6 but not all geographical codes have been added (curatorial level 6 = properly curated, United States National Museum classification; McGinley, pers. comm.). Holdings, types, and loans are currently being placed in a computer information retrieval system to facilitate multiple access (level 7).

### *Loan Policy*

Currently, loans are made for three years and are renewable following notification. Loan requests should be addressed to Dr. John A. Chemsak (same address as authors).

Table 1. Summary of the Apoidea holdings of the Essig Museum of Entomology, University of California, Berkeley

Family	Estimated number of specimens	Number of genera	Total number	Species and subspecies			Number with vouchers <sup>3</sup>	Number with nest materials
				Number with type specimens				
				Name-bearing <sup>1</sup> type	Allotype <sup>1</sup>	Paratype <sup>2</sup>		
Colletidae	6,000	13	118	6	5	11	0	0
Oxaeidae	1,000	4	13	2	3	4	0	0
Andrenidae <sup>4</sup>	70,000	17	786	165	87	284	7	9
Mellitidae	3,000	1	14	0	0	0	0	0
Halictidae	36,000	33	291	9	3	10	0	0
Megachilidae	73,000	29	519	5	2	23	2	2
Anthophoridae	85,000	51	678	37	28	67	21	12
Apidae	40,000	30	246	0	0	5	0	0
Totals	314,000 <sup>5</sup>	177	2,665	224	128	404	30	23

1. Deposited on indefinite loan at the California Academy of Sciences, San Francisco, as of December, 1986.

2. In Essig Museum

3. Mostly of pollination biology studies

4. Also 21 species with stylopized representatives

5. Not included in our summary are about 20,000 bees in Schmitt boxes and most of the specimens on loan to specialists.

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